

# **Interview Summary**

Application No.

09/897,453

Applicant(s)

MAUNULA, TEUVO

Examiner

Hien Tran

Art Unit

1764

All participants (applicant, applicant's representative, PTO personnel):

(1) Hien Tran.

(3) \_\_\_\_\_.

(2) Jeffrey G. Killian.

(4) \_\_\_\_\_.

Date of Interview: 14 January 2004.

Type: a) ☐ Telephonic b) ☐ Video Conference

c) ☒ Personal [copy given to: 1) ☐ applicant 2) ☒ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.

If Yes, brief description: \_\_\_\_\_.

Claim(s) discussed: All (attached cls)

Identification of prior art discussed: Art of record.

Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: 112 issues were discussed. Applicants argues that the instant oxidation catalyst (page 13, line 27+) is a nitrogen oxide oxidation catalyst and therefore is different from the three-way catalyst or the SCR catalyst of the WO '647 (e.g. reduction of nitrogen oxide) (page 4 in WO '647). The attorney will amend the claims to address this limitation.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

*Hien Tran*

Examiner's signature, if required

draft

## Current Claims

1. (Currently Amended) A system for purifying a flow of exhaust gases of diesel or gasoline multicylinder engines containing, on average, an excess of oxygen, and in which a mixing ratio of the engine is periodically adjusted from a lean mixing ratio to a more stoichiometric or rich mixing ratio with a  $\lambda$  value below 1.2, the system comprising a combination of three operational units including:

~~a single an~~ oxidation catalyst, a particle separator; and an NO<sub>x</sub> adsorption catalyst, wherein, in a flow direction of the exhaust gas, the NO<sub>x</sub> adsorption catalyst is arranged as a first operational unit and the NO<sub>x</sub> adsorption catalyst is arranged in a first structure before the oxidation catalyst arranged in a second structure, or the NO<sub>x</sub> adsorption catalyst is arranged before the oxidation catalyst in the same structure ~~the NO<sub>x</sub> adsorption catalyst located upstream or at the same location as the sole oxidation catalyst, with respect to the flow of exhaust gases,~~ whereby the system reduces the amounts of hydrocarbons, carbon monoxide, nitrogen oxides and particles present in the exhaust gas.

Claim 2 (Canceled).

3. (Previously Presented) The system of Claim 1, wherein the order of the operational units, in flow direction of the exhaust gas, is as follows: the NO<sub>x</sub> adsorption catalyst, the particle separator, and the oxidation catalyst.

4. (Previously Presented) The system of Claim 1, wherein the order of the operational units, in flow direction of the exhaust gas, is as follows: the NO<sub>x</sub> adsorption catalyst, the oxidation catalyst, and the particle separator.

5. (Currently Amended) The system of Claim 1, further comprising an exhaust gas discharge line ~~of~~ for each cylinder of the engine, the exhaust gas discharge lines is connected to a connecting channel, wherein said ~~combination of~~ *of at least one unit of the* operational units are arranged within the exhaust gas discharge line and the connecting channel. (Fig 3 and p.7 line 17 et seq.)

6. (Currently Amended) The system of Claim 1, further comprising an exhaust gas discharge line for each cylinder of the engine, each of the exhaust gas discharge lines connected to a connecting channel, wherein ~~the~~ NO<sub>x</sub> adsorption catalyst is arranged in an each exhaust gas discharge line ~~of each cylinder of the engine, said discharge lines being connected to a connecting channel~~ and wherein said oxidation catalyst and said particle separator are arranged in the connecting channel. (Fig 3)

7. (Previously Presented) The system of Claim 1, wherein the system includes two or more partial systems in parallel, each of the partial systems comprising said operational units.

8. (Previously Presented) The system of Claim 1, wherein the NO<sub>x</sub> adsorption catalyst and/or oxidation catalyst are disposed in the same structure with the particle separator.

9. (Previously Presented) The system of Claim 1, wherein the oxidation catalyst contains platinum and/or palladium catalytic metal(s).

10. (Currently Amended) The system of claim 1, further comprising an exhaust gas discharge line for each cylinder of the engine or <sup>one</sup> a single exhaust gas discharge line for two cylinders of the engine, ~~wherein the exhaust gases contain at least one of nitrates and particles~~ and wherein ~~the~~ NO<sub>x</sub> adsorption ~~catalysts~~ catalyst is arranged in each an exhaust gas discharge line ~~of each cylinder, or in each of the exhaust gas discharge lines of two cylinders.~~

11. (Currently Amended) The system of Claim 10 wherein the NO<sub>x</sub> adsorption catalyst is capable of periodic regeneration, ~~and wherein, regeneration of the NO<sub>x</sub> adsorption catalyst, reduction of nitrates, and burning of particles is accomplished by periodically~~ using a fuel with the lean mixture mixing ratio and a the fuel with the rich mixture mixing ratio. (Fig 4)

12. (Currently Amended) The system of Claim 11, wherein a ratio defined by duration of injection of the fuel with the lean mixture mixing ratio to duration of injection of the fuel with the rich mixture mixing ratio is more than 3.

13. (Previously Presented) The system of Claim 10, wherein said NO<sub>x</sub> adsorption catalyst contains catalytic metal platinum and/or rhodium and at least one of the following elements: Ba, Sr, La, Y, Ce, Zr.

Claims 14-19 (Withdrawn).

20. (Previously Presented) The system of claim 12, wherein the ratio is more than 10.

21. (Previously Presented) The system of claim 13, wherein the NO<sub>x</sub> catalyst further contains at least one of the following elements: Li, Na, K, Rb, Cg, Be, Mg, and Ca.

Claims 22-26 (Withdrawn).

27. (Previously Presented) The system of claim 1, wherein the NO<sub>x</sub> adsorption catalyst and the particle separator are disposed at the same location.

28. (Previously Presented) The system of claim 1, wherein the oxidation catalyst and the particle separator are disposed at the same location.

29. (Currently Amended) The system of claim 1, wherein the oxidation catalyst ~~also~~ reduces nitrogen oxides.

30. (New) The system of claim 1, wherein the NO<sub>x</sub> adsorption catalyst reduces nitrates and burns particles.

32. (New) The system of claim 1, wherein NO<sub>3</sub><sup>-</sup> bound in the NO<sub>x</sub> adsorption catalyst is reduced to NO<sub>x</sub>, the NO<sub>x</sub> subsequently regenerating the particle separator.

32. (New) The system of claim 1, wherein the first structure is an exhaust gas discharge line from <sup>one</sup> ~~a single~~ cylinder of the engine and the second structure is a connecting channel downstream of the first structure in a direction of the flow of exhaust gases.

33. (New) The system of claim 1, wherein the first structure is an exhaust gas discharge line from a plurality of cylinders of the engine and the second structure is a connecting channel downstream of the first structure in a direction of the flow of exhaust gases.